[0040] What is claimed is:

1. An eddy current sensor for measuring characteristics of a nearby, moving, electrically conductive object, the sensor comprising:

a uniaxial permanent magnet for generating a stationary magnetic field, the magnet being sized and shaped so that the stationary magnetic field can be intersected by the moving conductive object;

a winding core comprising a magnetically permeable material generally coaxial with the magnet; and

a coil wound around the winding core so that a signal voltage can be produced on the coil in response to a variable magnetic field caused by eddy currents in the conductive object as the conductive object passes through the stationary magnetic field.

2. The eddy current sensor as recited in claim 1, wherein the magnet is also the winding core, and the magnet is generally rectangular in cross-section, has a greatest dimension of length, and is magnetized along one of its two minor axes, whereby the sensor is monodirectional.

3. The eddy current sensor as recited in claim 1, wherein the magnet is generally cylindrical, has a central longitudinal axis, and is magnetized along the axis, whereby the sensor is omnidirectional.

4. The eddy current sensor as recited in claim 3, wherein the winding core is a cylindrical rod mounted to a pole of the cylindrical magnet distal from the moving conductive object.

5. The eddy current sensor as recited in claim 3, wherein the cylindrical magnet is also the winding core.

6. The eddy current sensor as recited in claim 3, wherein the winding core is a cylindrical rod mounted to a pole of the cylindrical magnet distal from the moving conductive object, and the coil is wound around the magnet and the rod.

7. An eddy current sensor for measuring characteristics of a nearby, moving, electrically conductive object with an intervening barrier of material between the sensor and the object, the barrier causing alternating magnetic fields to provide inadequate sensor performance, the sensor comprising:

a uniaxial permanent magnet for generating a stationary magnetic field, the magnet being mounted proximate to the barrier and sized and shaped so that the stationary magnetic field penetrates through the barrier and can be intersected by the moving conductive object;

a winding core comprising a magnetically permeable material generally coaxial with the magnet; and

a coil wound around the winding core so that a signal voltage can be produced on the coil in response to a variable magnetic field caused by eddy

currents in the conductive object as the conductive object passes through the stationary magnetic field.

8. The eddy current sensor as recited in claim 7, wherein the magnet is also the winding core, and the magnet is generally rectangular in cross-section, has a greatest dimension of length, has a longitudinal central major axis that is generally parallel to the proximate surface of the barrier, and is magnetized along one of its two minor axes, whereby the sensor is monodirectional.

9. The eddy current sensor as recited in claim 7, wherein the magnet is generally cylindrical, has a central longitudinal axis that is generally perpendicular to the proximate barrier surface, and is magnetized along the axis, whereby the sensor is omnidirectional.

10. The eddy current sensor as recited in claim 9, wherein the winding core is a cylindrical rod mounted to a pole of the cylindrical magnet distal from the barrier.

11. The eddy current sensor as recited in claim 9, wherein the cylindrical magnet is also the winding core.

12. The eddy current sensor as recited in claim 9, wherein the winding core is a cylindrical rod mounted to a pole of the cylindrical magnet distal from the barrier, and the coil is wound around the magnet and the rod.

13. An eddy current sensor for measuring characteristics of moving turbine blades of a jet engine having a casing, through which the sensor measures the blade characteristics, the sensor comprising:

a uniaxial permanent magnet for generating a stationary magnetic field, the magnet being mounted proximate to the casing and sized so that the stationary magnetic field penetrates through the casing and can be intersected by a portion of the blade, wherein the magnet is generally rectangular in cross-section, has a greatest dimension of length, has a longitudinal central major axis that is generally parallel to the proximate surface of the casing, and is magnetized along one of its two minor axes; and

a coil wound around the magnet so that a signal voltage can be produced on the coil in response to a variable magnetic field caused by eddy currents in the blade as the blade passes through the stationary magnetic field, whereby the sensor is monodirectional.

14. The eddy current sensor as recited in claim 13, wherein the magnet material is selected from the group consisting of Neodymium-Iron-Boron, Samarium-Cobalt, and Aluminum-Nickel-Cobalt.

15. An eddy current sensor for measuring characteristics of moving turbine blades of a jet engine having a casing, through which the sensor measures the blade characteristics, the sensor comprising:

a uniaxial permanent magnet for generating a stationary magnetic field, the magnet being mounted proximate to the casing and sized so that the stationary magnetic field penetrates through the casing and can be intersected by a portion of the blade, wherein the magnet is generally cylindrical, has a central longitudinal axis that is generally perpendicular to the proximate barrier surface, and is magnetized along the axis;

a winding core comprising a magnetically permeable material generally coaxial with the magnet; and

a coil wound around the winding core so that a signal voltage can be produced on the coil in response to a variable magnetic field caused by eddy currents in the blade as the blade passes through the stationary magnetic field, whereby the sensor is omnidirectional.

16. The eddy current sensor as recited in claim 15, wherein the magnet material is selected from the group consisting of Neodymium-Iron-Boron, Samarium-Cobalt, and Aluminum-Nickel-Cobalt.

17. The eddy current sensor as recited in claim 16, wherein the winding core is a cylindrical rod mounted to a pole of the magnet distal from the casing.

18. The eddy current sensor as recited in claim 16, wherein the cylindrical magnet is also the winding core.

19. The eddy current sensor as recited in claim 16, wherein the winding core is a cylindrical rod mounted to a pole of the cylindrical magnet distal from the casing, and the coil is wound around the magnet and the rod.

20. A method of measuring characteristics of moving turbine blades of a jet engine having a casing, through which blade characteristics are sensed, comprising the steps of:

generating a stationary magnetic field by using a uniaxial permanent magnet, the magnet being mounted proximate to the casing and sized so that the stationary magnetic field penetrates through the casing and can be intersected by a portion of the blade, the magnet being generally rectangular in cross-section, having a greatest dimension of length, having a longitudinal central major axis that is generally parallel to the proximate surface of the casing, and being magnetized along one of its two minor axes;

producing a signal voltage on a coil wound around the magnet in response to a variable magnetic field caused by eddy currents in the blade as the blade passes through the stationary magnetic field; and

measuring the signal voltage.

21. A method of measuring characteristics of moving turbine blades of a jet engine having a casing, through which blade characteristics are sensed, comprising the steps of:

generating a stationary magnetic field by using a uniaxial permanent magnet, the magnet being mounted proximate to the casing and sized so that the stationary magnetic field penetrates through the casing and can be intersected by a portion of the blade, the magnet being generally cylindrical, having a central longitudinal axis that is generally perpendicular to the proximate barrier surface, and being magnetized along the axis;

producing a signal voltage on a coil wound around a winding core in response to a variable magnetic field caused by eddy currents in the blade as the blade passes through the stationary magnetic field; and

measuring the signal voltage.

22. The method of sensing characteristics of moving turbine blades of a jet engine as recited in claim 21, wherein the winding core is a cylindrical rod mounted to a pole of the magnet distal from the casing.

23. The method of sensing characteristics of moving turbine blades of a jet engine as recited in claim 21, wherein the cylindrical magnet is also the winding core.

24. The method of sensing characteristics of moving turbine blades of a jet engine as recited in claim 21, wherein the winding core is a cylindrical rod mounted to a pole of the cylindrical magnet distal from the casing, and the coil is wound around the magnet and the rod.